

## Nomenclature Committee of the International Union of Biochemistry and Molecular Biology (NC-IUBMB)

In consultation with the IUPAC-IUBMB Joint Commission on Biochemical Nomenclature (JCBN)

# Enzyme Nomenclature

## Recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the Nomenclature and Classification of Enzymes by the Reactions they Catalyse

<http://www.chem.qmul.ac.uk/iubmb/enzyme/>

World Wide Web version prepared by G.P. Moss  
Department of Chemistry, Queen Mary University of London,  
Mile End Road, London, E1 4NS, UK  
[g.p.moss@qmul.ac.uk](mailto:g.p.moss@qmul.ac.uk)

To SEARCH for Information on Enzymes on the Database CLICK HERE.

This page contains general information on enzyme nomenclature. It includes links to individual documents, and the number of these will increase as more sections of the enzyme list are revised. It also provides advice on how to suggest new enzymes for listing, or correction of existing entries.

### Historical Introduction

In *Enzyme Nomenclature* 1992 there was an historical introduction. This web version is slightly edited from that in the book.

### Printed Version

Published in *Enzyme Nomenclature* 1992 [Academic Press, San Diego, California, ISBN 0-12-227164-5 (hardback), 0-12-227165-3 (paperback)] with Supplement 1 (1993), Supplement 2 (1994), Supplement 3 (1995), Supplement 4 (1997) and Supplement 5 (in *Eur. J. Biochem.* 1994, **223**, 1-5; *Eur. J. Biochem.* 1995, **232**, 1-6; *Eur. J. Biochem.* 1996, **237**, 1-5; *Eur. J. Biochem.* 1997, **250**, 1-6, and *Eur. J. Biochem.* 1999, **264**, 610-650; respectively) [Copyright IUBMB].

Each enzyme has recorded at the end details of when first published in *Enzyme Nomenclature* or when added to the database and its subsequent history.

### Web Version of Enzyme Nomenclature

The complete contents of *Enzyme Nomenclature*, 1992 (plus subsequent supplements and other changes) are listed below in enzyme number order giving just the recommended name. Each entry provides a link to details of that enzyme. Alternatively if looking for a specific reaction used in the classification of enzymes the broad outline defined by the first two numbers are given below. Each of these subclass entries is linked to a location where the category is subdivided to sub-subclasses. These in turn are linked to a list of recommended names for each enzyme in the sub-subclass.

### List of Recommended Names for Enzymes

The common names of all listed enzymes are listed below, along with their EC numbers. Where an enzyme has been deleted or transferred to another EC number, this information is also indicated. Each list is linked to either **separate** entries for each entry or to files with **up to 50** enzymes in each file.

| Common Names for:         | List linked to:          |                          |
|---------------------------|--------------------------|--------------------------|
| <b>EC 1.1 to EC 1.3</b>   | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 1.4 to EC 1.97</b>  | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 2.1 to EC 2.4.1</b> | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 2.4.2 to EC 2.9</b> | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 3.1 to EC 3.3</b>   | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 3.4 to EC 3.12</b>  | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 4</b>               | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 5</b>               | <a href="#">separate</a> | <a href="#">up to 50</a> |
| <b>EC 6</b>               | <a href="#">separate</a> | <a href="#">up to 50</a> |

Proposed additions and changes to this list are given separately (details below).

### Glossary, Reaction pathways and Links to Other Databases

A start has been made in showing the pathways in which enzymes participate. Thus, for example, a link under EC 5.3.3.2 (isopentenyl-diphosphate isomerase) leads to the pathway from mevalonate to terpenes, and links under EC 1.14.99.7 (squalene monooxygenase) and EC 5.4.99.7 (lanosterol synthase) lead to pathways of steroid formation. For other enzymes a glossary entry has been added which may be just a systematic name or a link to a graphic representation. The glossary from *Enzyme Nomenclature*, 1992 may also be consulted. This has been updated with subsequent glossary entries. Each enzyme entry has links to other databases. For recent entries these may not yet have been implemented on the other database. For details on the information provided [click here](#).

### Enzyme Supplement 6, 7, 8, 9 and 10 (electronic only)

Six documents listing additions and corrections to previous entries were approved in 2000. These together form [Supplement 6](#).

Five documents were approved in 2001 and form [Supplement 7](#).

Three documents (six files) were approved in 2002 and form [Supplement 8](#).

Three documents (five files) have been approved in 2003 and form [Supplement 9](#).

Three documents have been approved in 2004 and form [Supplement 10](#).

Six documents have been approved in 2005 and form [Supplement 11](#).

Four files have been approved in 2006 and form [Supplement 12](#).

Two files have been approved in 2007 and form [Supplement 13](#).

One files has been approved in 2008 and form [Supplement 14](#).

Minor corrections or changes are listed separately.

The entries are © Copyright to the International Union of Biochemistry and Molecular Biology.

### Proposed New Entries and Revised Entries

Proposals for new entries to the Enzyme List and revisions of previously published entries are available from the following files:

[New Enzymes](#) (added July 2006)

Suggestions and comments should be made to [Professor K.F. Tipton and Dr S. Boyce](#) (Department of Biochemistry, Trinity College Dublin, Dublin 2, Ireland).

### How to suggest new entries and correct existing entries

Information about [new enzymes](#) or [corrections](#) to existing entries may be reported directly from these web pages or by using the form printed in the back of *Enzyme Nomenclature*. [Advice](#) is available on how to suggest new enzymes for listing, or corrections of existing entries. Comments and suggestions on enzyme classification and nomenclature also may be sent to [Professor K.F. Tipton and Dr S. Boyce](#) Department of Biochemistry, Trinity College Dublin, Dublin 2, Ireland (E-mail: [sboyce@tcd.ie](mailto:sboyce@tcd.ie)).

### Rules for the Classification and Nomenclature of Enzymes

In *Enzyme Nomenclature* 1992 there was a section on general principles; recommended and systematic names; scheme of classification and numbering of enzymes; and rules for classification and nomenclature. This [web version](#) is slightly edited from that in the book.

### Enzyme Subclasses

The links are to a list of **sub-subclasses** which in turn list the enzymes linked to separate files for each enzyme, *or* to a list as part of a file with **up to 50** enzymes per file.

| Subclass      | Name   | Enzyme file type               |                          |
|---------------|--|--------------------------------|--------------------------|
| <b>EC 1</b>   | <b>Oxidoreductases</b>                           |                                |                          |
| <b>EC 1.1</b> | Acting on the CH-OH group of donors              | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.2</b> | Acting on the aldehyde or oxo group of donors    | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.3</b> | Acting on the CH-CH group of donors              | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.4</b> | Acting on the CH-NH <sub>2</sub> group of donors | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.5</b> | Acting on the CH-NH group of donors              | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.6</b> | Acting on NADH or NADPH                          | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.7</b> | Acting on other nitrogenous compounds as donors  | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.8</b> | Acting on a sulfur group of donors               | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |
| <b>EC 1.9</b> | Acting on a heme group of donors                 | <a href="#">sub-subclasses</a> | <a href="#">up to 50</a> |

|                |  |                |          |
|----------------|--|----------------|----------|
| <b>EC 1.10</b> | Acting on diphenols and related substances as donors                         | sub-subclasses | up to 50 |
| <b>EC 1.11</b> | Acting on a peroxide as acceptor   | sub-subclasses | up to 50 |
| <b>EC 1.12</b> | Acting on hydrogen as donor  | sub-subclasses | up to 50 |
| <b>EC 1.13</b> | Acting on single donors with incorporation of molecular oxygen (oxygenases)  | sub-subclasses | up to 50 |
| <b>EC 1.14</b> | Acting on paired donors, with incorporation or reduction of molecular oxygen | sub-subclasses | up to 50 |
| <b>EC 1.15</b> | Acting on superoxide radicals as acceptor                                    | sub-subclasses | up to 50 |
| <b>EC 1.16</b> | Oxidising metal ions   | sub-subclasses | up to 50 |
| <b>EC 1.17</b> | Acting on CH or CH <sub>2</sub> groups                                       | sub-subclasses | up to 50 |
| <b>EC 1.18</b> | Acting on iron-sulfur proteins as donors                                     | sub-subclasses | up to 50 |
| <b>EC 1.19</b> | Acting on reduced flavodoxin as donor  | sub-subclasses | up to 50 |
| <b>EC 1.20</b> | Acting on phosphorus or arsenic in donors                                    | sub-subclasses | up to 50 |
| <b>EC 1.21</b> | Acting on X-H and Y-H to form an X-Y bond                                    | sub-subclasses | up to 50 |
| <b>EC 1.97</b> | Other oxidoreductases  | sub-subclasses | up to 50 |
| <b>EC 2</b>    | <b>Transferases</b>  |                |          |
| <b>EC 2.1</b>  | Transferring one-carbon groups   | sub-subclasses | up to 50 |
| <b>EC 2.2</b>  | Transferring aldehyde or ketonic groups                                      | sub-subclasses | up to 50 |
| <b>EC 2.3</b>  | Acyltransferases   | sub-subclasses | up to 50 |
| <b>EC 2.4</b>  | Glycosyltransferases   | sub-subclasses | up to 50 |
| <b>EC 2.5</b>  | Transferring alkyl or aryl groups, other than methyl groups                  | sub-subclasses | up to 50 |
| <b>EC 2.6</b>  | Transferring nitrogenous groups  | sub-subclasses | up to 50 |
| <b>EC 2.7</b>  | Transferring phosphorus-containing groups                                    | sub-subclasses | up to 50 |
| <b>EC 2.8</b>  | Transferring sulfur-containing groups  | sub-subclasses | up to 50 |
| <b>EC 2.9</b>  | Transferring selenium-containing groups                                      | sub-subclasses | up to 50 |
| <b>EC 3</b>    | <b>Hydrolases</b>  |                |          |
|                |  | sub-           |          |

|                |   |                |          |
|----------------|---|----------------|----------|
| <b>EC 3.1</b>  | Acting on ester bonds                                     | subclasses     | up to 50 |
| <b>EC 3.2</b>  | Glycosylases  | sub-subclasses | up to 50 |
| <b>EC 3.3</b>  | Acting on ether bonds                                     | sub-subclasses | up to 50 |
| <b>EC 3.4</b>  | Acting on peptide bonds (peptidases)                      | sub-subclasses | up to 50 |
| <b>EC 3.5</b>  | Acting on carbon-nitrogen bonds, other than peptide bonds | sub-subclasses | up to 50 |
| <b>EC 3.6</b>  | Acting on acid anhydrides                                 | sub-subclasses | up to 50 |
| <b>EC 3.7</b>  | Acting on carbon-carbon bonds                             | sub-subclasses | up to 50 |
| <b>EC 3.8</b>  | Acting on halide bonds                                    | sub-subclasses | up to 50 |
| <b>EC 3.9</b>  | Acting on phosphorus-nitrogen bonds                       | sub-subclasses | up to 50 |
| <b>EC 3.10</b> | Acting on sulfur-nitrogen bonds                           | sub-subclasses | up to 50 |
| <b>EC 3.11</b> | Acting on carbon-phosphorus bonds                         | sub-subclasses | up to 50 |
| <b>EC 3.12</b> | Acting on sulfur-sulfur bonds                             | sub-subclasses | up to 50 |
| <b>EC 3.13</b> | Acting on carbon-sulfur bonds                             | sub-subclasses | up to 50 |
| <b>EC 4</b>    | <b>Lyases</b>   |                |          |
| <b>EC 4.1</b>  | Carbon-carbon lyases                                      | sub-subclasses | up to 50 |
| <b>EC 4.2</b>  | Carbon-oxygen lyases                                      | sub-subclasses | up to 50 |
| <b>EC 4.3</b>  | Carbon-nitrogen lyases                                    | sub-subclasses | up to 50 |
| <b>EC 4.4</b>  | Carbon-sulfur lyases                                      | sub-subclasses | up to 50 |
| <b>EC 4.5</b>  | Carbon-halide lyases                                      | sub-subclasses | up to 50 |
| <b>EC 4.6</b>  | Phosphorus-oxygen lyases                                  | sub-subclasses | up to 50 |
| <b>EC 4.99</b> | Other lyases  | sub-subclasses | up to 50 |
| <b>EC 5</b>    | <b>Isomerases</b>   |                |          |
| <b>EC 5.1</b>  | Racemases and epimerases                                  | sub-subclasses | up to 50 |
| <b>EC 5.2</b>  | <i>cis-trans</i> -Isomerases                              | sub-subclasses | up to 50 |
| <b>EC 5.3</b>  | Intramolecular isomerases                                 | sub-subclasses | up to 50 |

|                |                                       |                |                 |
|----------------|---------------------------------------|----------------|-----------------|
| <b>EC 5.4</b>  | Intramolecular transferases (mutases) | sub-subclasses | <u>up to 50</u> |
| <b>EC 5.5</b>  | Intramolecular lyases                 | sub-subclasses | <u>up to 50</u> |
| <b>EC 5.99</b> | Other isomerases                      | sub-subclasses | <u>up to 50</u> |
| <b>EC 6</b>    | <b>Ligases</b>                        |                |                 |
| <b>EC 6.1</b>  | Forming carbon—oxygen bonds           | sub-subclasses | <u>up to 50</u> |
| <b>EC 6.2</b>  | Forming carbon—sulfur bonds           | sub-subclasses | <u>up to 50</u> |
| <b>EC 6.3</b>  | Forming carbon—nitrogen bonds         | sub-subclasses | <u>up to 50</u> |
| <b>EC 6.4</b>  | Forming carbon—carbon bonds           | sub-subclasses | <u>up to 50</u> |
| <b>EC 6.5</b>  | Forming phosphoric ester bonds        | sub-subclasses | <u>up to 50</u> |
| <b>EC 6.6</b>  | Forming nitrogen—metal bonds          | sub-subclasses | <u>up to 50</u> |

---

Last update 20 May, 2008

[Return to main IUBMB Biochemical Nomenclature home page](#)

[Return to NC-IUBMB home page](#)

## IUBMB Enzyme Nomenclature

**EC 2.4.1.10**

**Accepted name:** levansucrase

**Reaction:** sucrose + [(2→6)-β-D-fructosyl]<sub>n</sub> = glucose + [(2→6)-β-D-fructosyl]<sub>n+1</sub>

**Other name(s):** sucrose 6-fructosyltransferase; β-2,6-fructosyltransferase; β-2,6-fructan:D-glucose 1-fructosyltransferase; sucrose:2,6-β-D-fructan 6-β-D-fructosyltransferase

**Systematic name:** sucrose:(2→6)-β-D-fructan 6-β-D-fructosyltransferase

**Comments:** Some other sugars can act as D-fructosyl acceptors.

**Links to other databases:** [BRENDA](#), [EXPASY](#), [GTD](#), [KEGG](#), [ERGO](#), [PDB](#), CAS registry number: 9030-17-5

**References:**

1. Hehre, E.J. Enzymic synthesis of polysaccharides: a biological type of polymerization. *Adv. Enzymol. Relat. Subj. Biochem.* 11 (1951) 297-337.
2. Hestrin, S., Feingold, D.S. and Avigad, G. The mechanism of polysaccharide production from sucrose. 3. Donor-acceptor specificity of levansucrase from *Aerobacter levanicum*. *Biochem. J.* 64 (1956) 340-351. [PMID: 13363847]
3. Reese, E.T. and Avigad, G. Purification of levansucrase by precipitation with levan. *Biochim. Biophys. Acta* 113 (1966) 79-83. [PMID: 5940635]

[EC 2.4.1.10 created 1961]

---

[Return to EC 2.4.1 home page](#)

[Return to EC 2.4 home page](#)

[Return to EC 2 home page](#)

[Return to Enzymes home page](#)

[Return to IUBMB Biochemical Nomenclature home page](#)